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OCEANOGRAPHY.—*The circulation of the abyssal water of the oceans.* AUSTIN H. CLARK, National Museum.

The geographical and bathymetrical distribution of the recent crinoids, animals which, occurring at all depths, are thruout life, with very few exceptions, strictly sessile, and of which the young are developed entirely in the water immediately surrounding the adults, furnishes data of the greatest importance for the solution of the problems connected with the abyssal circulation of the oceanic waters. This circulation, as would be expected, differs radically from the circulation of the surface waters, and is altogether of a much simpler type. As indicated by the distribution of the recent crinoids, the general scheme of the abyssal circulation of the oceanic water is as follows:

The surface water of the antarctic regions, bathing the shores of the antarctic continent and forming the circumpolar antarctic stream, is in reality abyssal water, derived entirely from the abysses of the Pacific, Atlantic and Indian oceans. It has nothing whatever to do with the surface water of the rest of the globe, from which it is separated by a broad neutral zone, the so-called west wind drift. Antarctic water enters the basins of the Pacific, Atlantic and Indian oceans in the form of great peripheral currents (the Humboldt, Benguela and Australian currents) flowing along their southern, southeastern and eastern borders, which, in the Pacific and Atlantic, plunge beneath the surface at about the latitude of the equator, but are continued as deep currents northward, westward, and finally for a greater or lesser distance

southward, along the eastern, northern and northwestern margins of these basins. At every point in their course these currents give off water from their seaward (left) side which falls into the abysses and forms the strictly abyssal water; on account of the effect of the rotation of the earth this process is carried on far more actively in the southern than in the northern hemisphere. In the northern hemisphere the rotation of the earth, instead of inducing the flow of water from the borders of these currents into the abysses, tends to cause the currents to hug the coast and, by rendering them more compact, to prevent the diffusion of their water and hence to maintain their motion and to preserve them as currents. Also it operates to bring their upper levels near the surface so that, wherever a powerful surface current flowing diagonally away from the shore causes the formation of a vacuum, as it were, between itself and the coast, the water of these peripheral currents, composed of water of the strictly abyssal type, and ultimately of antarctic origin, immediately rises to the surface. This occurs off northwestern Africa and off southern California, and again off the Kurile Islands and off the New England coast from Cape Cod northward; on the New England coast, however, the identity of the antarctic water is more or less concealed by mixture with water of low salinity coming from the north.

In the pocket-like Gulf of Alaska the rotation of the earth causes the water of the antarctic current to pile up, and to rise nearly, in the winter possibly in some places quite, to the surface. Over the surface of this cold antarctic water flows the wind-impelled drift from the Kuro-Siwo, which divides, part of it skirting the northern part of the Gulf of Alaska, and part flowing southward down the coast. The water of the Kuro-Siwo drift and the antarctic water are of the same salinity, and therefore they mix readily. Hence the southern derivative from the Kuro-Siwo drift, the so-called California current, as it flows southward dissolves into itself the cold water of the antarctic stream immediately beneath it, presenting the curious phenomenon of a current flowing southward, yet at the same time becoming colder and colder.

In the southwestern portion of the basins of the Pacific, Atlantic and Indian oceans the abyssal water slowly rises and, flowing southward, takes the place in the circumpolar antarctic circulation of the water lost thru the Humboldt, Benguela and Australian currents.

In the central portion of the oceanic basins the general motion of the water is from east to west, the water lost from the currents flowing northward across the basins and being picked up by the southerly currents on the other side. This circulation is rapid in the high southern latitudes, diminishing in intensity northward.

The water of the circumpolar west wind drift of low southern latitudes, north of the true antarctic current, is mainly surface water from the north caught up and driven forward by the strong wind. This west wind drift forms a band dividing the abyssal antarctic circulation from the superficial circulation further north.

By this drift many organisms, pelagic at some stage of their existence, or capable of transportation by floating objects, are distributed thruout the southern latitudes, tho they are unable to withstand truly antarctic conditions; and to this is largely due the similarity of the faunas of southern Africa, southern South America, southern Australia and New Zealand, a similarity which is in no way indicated by the crinoids of these localities.

GEOCHEMISTRY.—*Note on the chlorine content of rain water at Tortugas, Fla.* R. B. DOLE, Geological Survey. Communicated by F. W. Clarke.

The appreciable quantity of salt carried by normal rainfall off the seacoast is well shown by test of a sample collected by the writer on Loggerhead Key, Tortugas, Fla. After heavy all-night rains and morning showers had thoroly washed the roof of the Marine Biological Laboratory a large sample of rain was collected during the afternoon of June 13, 1913, in a galvanized bucket under one of the gutters. This sample was immediately bottled and later tested at Washington, D. C., by E. C. Bain. A 250 cc. portion concentrated to 25 cc. and titrated with a solution of silver nitrate, 1 cc. of which was equivalent to 0.5 mgm.

of chlorine, had a chlorine content of 2.9 parts per million. The residue from a liter dried at 180°C. was 31 parts per million, only a small part of which could be attributed to solution of the bottles for the residue contained but 2.0 parts per million of silica.

Tho this content of chlorine can not be considered an average because of the variable effect that wind-borne spray has on the salt in the rain it serves as a contribution to the rather scanty knowledge regarding the composition of rain water in the United States. The above-mentioned chlorine, 2.9 parts per million, is equivalent to about 5 parts of sea salt. With an annual rainfall of 60 inches this is equivalent to a precipitation of 65 pounds of salt per acre per annum. Figures quoted by Clarke[1] for Barbados are equivalent to 193 pounds and others range from 24 pounds in England to 298 pounds in Ceylon.

[1] Clarke, F. W., The data of geochemistry: U. S. Geol. Survey, Bull. 491, p. 50. 1911.

ABSTRACTS

Authors of scientific papers are requested to see that abstracts, preferably prepared and signed by themselves, are forwarded promptly to the editors. Each of the scientific bureaus in Washington has a representative authorized to forward such material to this journal and abstracts of official publications should be transmitted thru the representative of the bureau in which they originate. The abstracts should conform in length and general style to those appearing in this issue.

GEOLOGY.—*Some lavas of Monte Arci, Sardinia.* HENRY S. WASHINGTON. Am. Jour. Sci. (4). 1913.

This extinct volcano was visited in October, 1904. It has not been described since 1857. It is shown that the volcano consists of a core of rhyolite, with later flows of dacite, andesite and trachyte, closing with extensive sheets of basalt, in many respects resembling the nearby and better known Monte Ferru. Detailed petrographic descriptions of the lavas are given, together with seven complete analyses. An apparently new mineral was found, which is to be further investigated. The paper is a preliminary one, and the volcano is worthy of another visit and fuller study. H. S. W.

GEOLOGY.—*Observations on the Daubrée experiment and capillarity in relation to certain geological speculations.* JOHN JOHNSTON and L. H. ADAMS. J. Geol. 1913.

Those who believe that meteoric waters are an important factor in the production of the phenomena of volcanism must always face the problem of devising a plausible account of the manner in which accessions of water can be introduced into the magma. This difficulty they have endeavored to obviate by instancing an experiment of Daubrée, who found that water would pass thru a porous sandstone against a certain excess counter pressure of steam. This passage of water is, as Daubrée pointed out, a manifestation of capillary action; the authors show that this same effect may be secured by means of a much simpler experimental arrangement. Now capillary forces are effective only when there is a surface of separation within the pores; moreover they diminish steadily with rise of temperature, and vanish at the critical

point of the liquid. Consequently, the Daubrée experiment gives no ground for supposing that capillary forces would be effective in causing water to penetrate into deep seated and highly heated rock-masses. This conclusion has been pointed out before; the purpose of the present paper is to enforce it, since the opposite, and erroneous, conclusion still frequently appears as an argument in favor of the likelihood of the introduction of water by means of capillarity into molten magmas. Even if we make the somewhat unlikely assumption of free liquid surfaces far down in the rocks, any pressure producible by capillarity is in general likely to be small in comparison with the pressure due to the hydrostatic column, except in pores of such fineness that the amount of water that could flow thru them is infinitesimal. J. J. and L. H. A.

PLANT PHYSIOLOGY.—*The water requirements of plants. I. Investigations in the Great Plains in 1910 and 1911.* L. J. Briggs and H. L. Shantz. Bureau of Plant Industry, Bulletin 284, 1913.

This paper deals with the amount of water absorbed by plants in the production of a unit weight of dry matter. In order to determine this ratio, which is called the "water requirement," plants were grown to maturity in large pots having a capacity of about 115 kilos of soil, provided with tight covers, with openings for the plants, the space between the cover and the stem of the plant being sealed with wax. Thirty-one varieties were tested at Akron, Colorado, in 1911, six pots being used in each determination, and the results expressed with their probable error.

Of the crops tested, those most efficient in the use of water were millet, sorghum and corn, the ratio being 275, 306 and 362 respectively, that is, these crops used 275, 306 and 362 pounds of water in the production of one pound of dry matter. The least efficient were the legumes, alfalfa, Canada Pea and sweet clover, with ratios of 1069, 800 and 709, respectively, while the water requirement of the small grains was intermediate, being 507 for wheat, 539 for barley, 614 for oats, and 724 for rye.

Different varieties of the same crop showed measurable differences in their water requirements. Determinations made under field conditions agreed very well with the pot determinations. A comparison of the results with wheat and sorghum grown at Akron, Colorado, and Amarillo and Dalhart, Texas, showed that while evaporation in Texas was 18 per cent higher than in Colorado, sorghum had the same water requirement, while wheat required 36 per cent more water in Texas than in Colorado. L. J. B. and H. L. S.

PLANT PHYSIOLOGY.—*The water requirement of plants. II. A review of the literature.* L. J. BRIGGS and H. L. SHANTZ. Bureau of Plant Industry, Bulletin 285, 1913.

This paper reviews the literature relating to the water requirement of plants. In summarizing the papers the data are presented in tabular form and arranged with respect to the subject considered, such as the effect of soil moisture content, type of soil, amount of soil used, fertilizers, temperature, light, humidity, carbon dioxide content of the air, relative leaf area, duration and period of growth on the water requirement, as well as the water requirement of different plants when grown under comparable conditions. L. J. B. and H. L. S.

REFERENCES

TECHNOLOGY.—*Recent papers of the Bureau of Standards:*

The dehydration of clays. G. H. BROWN and E. T. MONTGOMERY. Pp. 23. 1913.

The effect of overfiring upon the structure of clays. A. V. BLEININGER and E. T. MONTGOMERY. Pp. 23. 1913.

The technical control of the colloidal matter of clays. H. E. ASHLEY. Pp. 118. 1913.

The determination of phosphorus in steels containing vanadium. J. R. CAIN and F. H. TUCKER. Pp. 11. 1913.

Electrolytic corrosion of iron in soils. BURTON MCCOLLUM and K. H. LOGAN. 1913.

PROCEEDINGS OF THE ACADEMY AND AFFILIATED SOCIETIES

THE GEOLOGICAL SOCIETY OF WASHINGTON

The 273d meeting of the Society was held in the Cosmos Club on October 29, 1913.

REGULAR PROGRAM

Physiography of the Southern Andes (illustrated.): BAILEY WILLIS. No abstract.

Use of physiography in the study of Rocky Mountain stratigraphy: W. T. LEE. Reasons are here presented for abandoning the belief that extensive land masses persisted in the southern Rocky Mountain region thruout the Cretaceous period. Radical differences of opinion exist as to the significance of certain continental deposits that rest unconformably on the Cretaceous rocks in the southern Rocky Mountain region. In many places on either side of the mountains the base of these continental deposits is conglomeratic and contains pebbles of older rocks, mainly the pre-Cambrian crystallines which constitute the core of the range. Those who believe that this conglomerate marks an unconformity of considerable magnitude appeal to the evidence of these pebbles as proof of a long interval of erosion following a notable upheaval of the mountains. Others who doubt the magnitude of the unconformity are of the opinion that the pebbles may have been derived from nearby lands that had not been previously submerged, and argue that they might have found their way to their present resting place without any notable upheaval or long interval of erosion. It seems necessary, therefore, to inquire whether the evidence warrants the belief that any considerable part of the southern Rocky Mountain region remained above sea-level thruout Cretaceous time or whether the Cretaceous sea extended uninterruptedly over this region. The determination of this question would materially aid in the solution of the problem whether the unconformity in the southern Rocky Mountain region marking the separation of the conformable Cretaceous beds, mainly of marine origin, from the lowest conglomerate of the younger rocks of continental origin, denotes an orogenic movement and erosion of sufficient magnitude to make it the appropriate line of separation between the Cretaceous and the Tertiary systems.

It seems evident that no notable crustal movement affected the southern Rocky Mountain region for a long time prior to the beginning of the Upper Cretaceous period, and that there was ample time for the formation of a peneplain over this region.

The distribution of the Dakota sandstone about the present mountains and its attitude toward them; its presence within the mountains at great altitudes; and its relation to the older formations seem to prove that the Dakota sandstone extended practically continuously over the present mountain region.

The distribution of the marine sediments of Colorado age, that lie on the Dakota sandstone, is essentially the same as that of the Dakota, that is, they occur on both sides of the mountains and at numerous places within the mountain region and their lithologic character is not such as to indicate that they were derived from the present mountain area rather than from the continental land masses that existed both east and west of the interior Cretaceous sea. Their presence near Breckenridge, Colorado at an altitude of 13,4000 feet, and in many other places at nearly as great altitudes, proves that these places at least were below sea-level in Colorado time, and an inspection of their distribution leaves little room for doubt that they were deposited continuously over the mountain region.

The sedimentary rocks of Montana age in the Rocky Mountain region are more variable than those of Colorado age, but their general lithologic character does not seem to harmonize with the postulate that any considerable part of them was derived from the present mountain area. In general, the marine shale formations thicken toward the present mountains while the sandstone formations thicken away from the mountains. In brief, the Upper Cretaceous formations behave as if no Rocky Mountains existed when they were laid down.

If the Rocky Mountain region was covered with Cretaceous sediments, it follows that this region must have been uplifted and the older rocks exposed to erosion before the conglomerate, consisting of pebbles of these older rocks, could have been formed.

The 274th meeting of the Society was held in the Cosmos Club on November 12, 1913.

Under informal communications Mr. EDSON S. BASTIN discussed the origin of the titaniferous iron ore at Caribou, Colorado. These ores occur within small, irregular bodies of gabbro which in turn lie within a large stock of monzonite. There is clear field evidence that both gabbro and iron ores are magmatic differentiations from the monzonite magma. The differentiation has proceeded along two lines leading to the formation within the same gabbro mass of (1) iron ores composed essentially of augite, magnetite and spinel, and (2) ores much richer in magnesia composed of olivine and magnetite. The chemical changes during differentiation were shown by plotting a number of analyses of these rocks and ores in diagrammatic form.

REGULAR PROGRAM

The change of optical and crystallographic properties of quartz with temperature. F. E. WRIGHT. This paper is published in full in Jour. Wash. Acad. Sciences, **3**, 485. 1913.

Evidence of the inorganic origin of petroleum: C. W. WASHBURNE. No abstract.

Resins in Paleozoic Coals: DAVID WHITE. The discoveries by European paleobotanists of supposed secretory cells and canals in petrified woods of Paleozoic age, were reviewed, and in the light of data afforded by certain American coals of low bituminous rank, interpreted as probably resin-bearing for the most part. This conclusion rests on the examination of the canal casts found in certain carbonized woods in the bituminous coals of the interior basins; on the observation of lumps of exudate resins in Paleozoic coals of Iowa, Illinois and Indiana, and, in particular on the physical and chemical characters of the canal fillings found in carbonized petioles in the upper part of the Quadrant quartzite of Montana all of which indicate that these secretions are resinous, and that, accordingly, some of the Paleozoic woods found petrified were resin-bearing. It appears that the resin contributions of the Paleozoic plants were perhaps as large as those furnished by the coal-forming floras of the Cretaceous and Tertiary.

Studies in a number of western coal fields of the occurrence of resins, which are always present and often conspicuous in the lower rank coals of the Cretaceous and Tertiary, show that when, as the result of regional metamorphism, these coals are brought to a low bituminous rank the effects of pressure metamorphism are found in physical changes as well as in probable chemical changes in the resin lumps; also that during the alteration indicated by the passage from about 58 per cent to 68 per cent fixed carbon (pure coal basis) the resin lumps have become crackled, changed to a dark brown, to a brownish black and, successively, to a black carbonaceous granular powder. The process seems, in effect, to be a devolatilization (carbonization) of the resin lumps. So far as known no resin lumps are present in coals characterized by so high a percentage of carbon (pure coal basis) as 68.

The deadening of the cannel coals found in association with high rank coals, such as semi-bituminous and anthracite, is thought to be due to the reduction of the waxy and resinous substances characteristic of the cannel group of coals. As causally related to this phenomenon attention was called to the fact that, so far as observed by the speaker, no commercial oil field has yet been found in any part of the earth in regions where the coals of the formations that contain or overlie the oil sands have been brought to a carbonization represented by 70 per cent or more, the inference being that the distillation of the organic matter has gone so far as to devolatilize or drive off the petroleum in the formations of these regions.

The 275th meeting of the Society was held in the Cosmos Club on November 26, 1913.

REGULAR PROGRAM

Quaternary History of the Mount St. Elias Region, Alaska: A. G. MADDREN. The southern slopes of the Mount St. Elias region front on the Pacific Ocean with a rather regular coast line that is in marked

physiographic contrast with the deeply-fiorded coast line of the southeastern Alaska and Prince William Sound regions on either side of it. This contrast is further accentuated by the much higher relief and rejuvenated recent glaciation of Alpine type. so strongly developed in the extensive area dominated by the great mountain masses of St. Elias and Logan, whose heights are about 18,000 and 19,500 feet respectively. The physiographic evidence clearly indicates that the Mount St. Elias province has not passed thru the same episodes of Quaternary development as have the deeply fiorded provinces which characterize the remainder of the Pacific continental shores of Alska to the southeast and southwest of its central part. The geologic evidence in this regard appears to prove that the relief of the Mount St. Elias region has been profoundly rejuvenated in late Pleistocene time, and to indicate the strong probability that this deformational uplift has continued thruout Recent up to present time. This evidence is in the form of a stratified marine coastwise terrane, from 4000 to 5000 feet thick where well developed, which is quite fossiliferous to the westward in the Yakataga district and in the Chaix Hills, where it is not altered by deformation as it is about Yakutat Bay and eastward. This terrane comprises one or more thick marine shale members that are remarkable from the fact that they contain quantities of ice-borne and glaciated bowlders and cobbles of a great variety of metamorphic rocks in unassorted arrangement. Blocks of these 5 to 10 feet in diameter are common in the shale matrix and give a most distinctive lithologic character to the terrane thruout its distribution, which enables it to be recognized where the shales are too much mashed to yield fossil remains. The fossils appear to be of early Pleistocene age. The whole terrane has been uplifted and deformed, so that it now stands at elevations from 3000 to 6000 feet above present sea level and forms the foothill mountains along the south flank of the St. Elias range.

The Cretaceous-Eocene contact in the Atlantic and Gulf Coastal Plain. L. W. STEPHENSON. The Cretaceous deposits of the Atlantic and Gulf Coastal Plain are separated from the overlying Eocene and younger formations by an unconformity of regional extent. Several authors, including Harris, Vaughan, Hill and Vaughan, and Dall, have stated some of the important facts in regard to the differences exhibited by the faunas on either side of the contact, but the magnitude of these differences has not been sufficiently recognized by geologists.

During the time represented by the unconformity separating the Cretaceous and Eocene strata some very important changes took place in the molluscan life of the area. A preliminary study of the mollusks of the upper part of the Cretaceous (*Exogyra costata* zone) of the eastern Gulf region, where the hiatus is as narrow as it is anywhere in the Atlantic and Gulf Coastal Plain, has shown that of 168 identified species practically all became extinct before the Eocene Midway formation began to be deposited. These species represent 89 genera, of which at least 16 of the more common genera, including one whole order—the Ammonoidea—became extinct. These faunal differences are greater

than those which transpired thru evolutionary development during the time of deposition of the Tombigbee sand and the overlying Selma chalk and its non-chalky equivalents, or in terms of the Western Interior section, approximately during the time required for the deposition of the Niobrara formation and the Montana group.

Harris and Vaughn have both published statements to the effect that there is a great break, both stratigraphic and faunal, between the Cretaceous and the Eocene, as evidenced by the fact that not a single species is known certainly to have crossed from one system to the other. Vaughan characterized the differences as expressive of a complete faunal revolution. In his opinion the changed that took place in the marine life of the Atlantic and Gulf Coastal Plain during the time represented by the unconformity, are more striking than those that have taken place between earliest Midway time and the present, for no great orders that lived during Midway time, comparable to the Ammonoidea, have become extinct.

In the opinion of E. W. Berry, as expressed in a letter to the writer, the differences in the Cretaceous and Eocene floras of the eastern Gulf region are profound, and he believes that the unconformity represents a very long interval.

The hiatus marks a great diastrophic movement, as a result of which the shore lines were pushed far to the eastward and southward. The faunas were thus forced into new environments. Altho there is no evidence of marked climatic changes, unknown factors may have induced more rapid evolutionary changes in the marine life, but liberal allowance being made for a quickening of development, the hiatus must have been of great duration in order to produce the observed changes, even when measured in terms of geologic time. How much of that time should be classed as Cretaceous and how much as Tertiary cannot be determined with the available data. Cretaceous time, however, did not end with the deposition of the uppermost Cretaceous strata as preserved, neither did Eocene time begin with the deposition of the lowermost Eocene strata, but the lines separating the two periods probably lies somewhere toward the middle of the hiatus.

The contact metamorphic copper deposits at Mackay, Idaho. J. B. UMPLEBY. The contact metamorphic copper deposits at Mackay, Idaho, are of particular interest because they represent the replacement of engulfed blocks of limestone after the solidification and jointing of the porphyry inclosing them. Eight of these engulfed blocks and several shoots of garnet-diopside rock, clearly of limestone derivation, crop out in an area of about one square mile. The most complete metamorphism is of blocks along a pronounced fault, but metamorphism is locally intense where only normal jointing of the porphyry was observed.

Both exomorphism and endomorphism are clearly recorded. The former changed the blue limestone of White Knob into white marble thruout a mass one square mile in area and 1000 feet thick. It also caused a conspicuous marmorization of the engulfed blocks of limestone. Here a broken zone of garnet-diopside rock is external to the marble

zone. On White Knob lime-silicate rock is not abundant, but in one place it comprises a vein 3 to 5 feet wide which cuts across the marble beds.

The garnetization of the porphyry is clearly shown at several places in the mine. In one specimen garnet replaces the granite-porphyry along joints and in another as a wave advancing into unfractured but permeable material. In places ore bodies cut directly across the limestone-granite-porphyry contact. Elsewhere garnet-chalcopyrite ore, in bunches of minable size, occurs at the intersection of joints well out in the granite-porphyry.

These features are believed to indicate: (1) that the garnetization took place after the solidification and fracturing of the inclosing porphyry, and (2) that, because the limestone blocks were entirely surrounded by rigid porphyry at the time of metamorphism, the silica, alumina, and iron of the silicate rock could not have been concentrated from the limestone, but must have been supplied by deeper unconsolidated portions of the batholith.

ADOLPH KNOPF, *Acting Secretary.*

THE CHEMICAL SOCIETY

The 231st meeting was held at the Cosmos Club on November 25, 1913. Dr. P. A. LEVENE, of the Rockefeller Institute of Medical Research of New York City spoke on *The chemistry of the nucleic acids.* He told the story of his own initiation into the study of the chemistry of living tissue, and sketched the early history of the researches on the nucleic acids of protein. It was early established that the molecule of one of the more complicated of these acids contains two purin bases, two pyrimidine bases, phosphoric acid, and a carbohydrate. The German investigators directed attention to a simpler acid, inosinic acid, the study of which was taken up by Dr. Levene and his co-workers, with gratifying success. This acid contains hypoxanthin, phosphoric acid and a new pentose sugar, ribose. Further studies showed the relations of these groups in the compound. The successive details by which the structure of the other analogous acids was worked out, both as to the main groups and the structures within the groups, cannot be given in a brief abstract, altho of the greatest interest even to those comparatively uniformed in this complex branch of organic chemistry.

Discussion. Acree pointed out that the work of Dr. Levene has cleared up the configuration of the pentoses, and emphasized the ultimate practical importance of these researches. Seidell inquired as to the synthesis of these compounds; Dr. Levene stated that most such efforts have been unsuccessful; furthermore, that their analysis is more important at present than their synthesis. Schreiner gave an appreciation of these researches from the standpoint of the student who wishes to get at the composition of the compounds commonly produced in nature, as against those devised by man. Berg inquired as to the molecular weight of the nucleic acids; the simplest has been shown to be probably

twice the structural formula. Voegtlin spoke of the application of enzymes in analyzing the acids into their component groups. In reply to questions by Johnston, Acree, Chesnut and others the following points were brought out: There is no evidence that there is more than one animal nucleic acid and one plant acid of the polynucleitide structure, tho there are several mono-nucleitides. The origin of the sugar groups is not known; experimentally, the breaking up of the hexoses by enzymes always leads to two 3-carbon chains, never to a pentose. The animal acid contains a hexose, whose structure is not yet known. A living animal enzyme is necessary for the analysis of the animal acid, and the technique involves the skill of the surgeon as well as that of the chemist.

ROBERT B. SOSMAN, *Secretary.*

THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON

The 469th regular meeting of the Anthropological Society of Washington, was held November 25, 1913, in the National Museum.

DR. DANIEL FOLKMAR, who has charge of the report on "Mother Tongue" in the census, addressed the Society on *Some results of the first census of European races in the United States.* Statistics of the mother tongue, or native language, of the "foreign white stock" of the United States are presented in the report soon to be issued by the Bureau of the Census. It was prepared under the supervision of the chief statistician for population, assisted by the speaker as expert special agent. There are presented, for the first time in the census, figures directly relating to the ethnic composition of the white population of the United States, in so far as that is indicated by the native language. This term is taken to mean the language of customary speech in the homes of the immigrants before immigration.

One of the most interesting facts disclosed in this report is the great numerical preponderance, which is still held by the mother tongues of northwestern Europe as a whole, notwithstanding the high rank numerically which has been gained by a few individual mother tongues from eastern and southern Europe—especially the Italian, Polish, and Yiddish. These three now stand third, fourth, and fifth in rank. The English mother tongue is by all odds the one most largely represented in the foreign white stock of the United States. The number, 10,037,420, is considerably greater than that of the German mother tongue, which latter, contributes more than one-fourth (27.3 per cent) of the total foreign white stock of the United States, as reported in 1910. Italian, Polish, and Yiddish come next in rank, but none of them number as much as one-fourth of the German. To these three mother tongues, intermediate in rank but considerable in number, may be added the Swedish, French, and Norwegian, all belonging to northwestern Europe, except a portion of the French. No other mother tongue than the eight thus far enumerated furnishes as much as 2 per cent of the total of the foreign white stock of the United States, or numbers as much as

1,000,000. The eight major mother-tongue stocks already named account for 87.5 per cent of the total foreign white stock.

How small a factor the "new" immigration from southern and eastern Europe really is up to the present time, may be better shown by comparing it with the total white population of the United States. Taking as 100 per cent the total white population of the United States in 1910, numbering 81,731,957, the so-called "native stock" constitutes 60.5 per cent and the three great linguist families of foreign stock from northwestern Europe constitute 27.1 per cent, making a total of 87.6 per cent. The elements from southern and eastern Europe constitute, therefore, less than 13 per cent of the total. Of this the two principal Latin mother tongues—the French and the Italian—contribute less than 5 per cent, and the two principal Slavic mother tongues—the Polish and the Bohemian—and the Hebrew, taken together, contribute also less than 5 per cent, leaving to all the remaining mother tongues another 5 per cent or less of the total. Of the total foreign white stock of the United States, 32,243,382, there are 8,817,271 persons who are of German stock when counted according to mother tongue, but a trifle under 8,500,000 (8,495,142) of German stock when counted by their country of origin, Germany.

Immigrants from Austria are far more Slavic than Germanic. Russian immigration is shown to be far more Hebrew (52.3 per cent) than Russian (2.5 per cent) or even Slavic. Immigration from Turkey in Europe is not so much Turkish as Greek and Bulgarian.

Both the first and the second generations of immigration from Russia show that over 0.50 per cent report Yiddish and Hebrew as their mother tongue.

The returns for "Yiddish and Hebrew" reflect ethnic composition less satisfactorily than the returns for other mother tongues. A part—how large a part there is no means of judging—of those whose ancestral language is Hebrew doubtless have reported German, English, Polish, or other mother tongues. Of the total number of Yiddish-speaking people 838,193 come from Russia, 144,484 from Austria-Hungary, 41,342 from Roumania, 14,409 from the United Kingdom and 7,910 from Germany.

The paper was discussed by Messrs. Stetson, Hough, and Farquhar and Mrs. James.

DANIEL FOLKMAR, *Secretary.*

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